

Province-level variation in the achievement of below-replacement fertility in China

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Background

- China's fertility fell below replacement in the early 1990s
- Below-replacement fertility is defined as a total fertility rate (TFR) below 2.1 births per woman
- Many studies of fertility in China have focused on the national level. This paper focuses on the province level

Why focus on province level?

- There are two main reasons to expect substantial variation by province in the speed and extent of TFR decline:
 - The implementation of one-child policy has varied by province, mainly by whether a second birth is allowed in rural areas and among some ethnic minority groups
 - The level and pace of economic and social development, which also affects fertility, has varied by province

Objectives

- To describe province-level variation in the year in which below-replacement fertility was achieved (**part one**: descriptive analysis)
- To assess the relative importance of population policy and economic and social development in explaining province-level variation in the TFR in 2000 (**part two**: path analysis)

Data for descriptive analysis

- Annual province-level fertility estimates between 1975 and 2000 are from a recent report on *Fertility Estimates for Provinces of China*, based on the 1990 and 2000 censuses (NBS of China and EWC 2007)
- The report is downloadable at:
<http://www.eastwestcenter.org/fileadmin/stored/pdfs/popfertilityestimateschina.pdf>
 - Fertility measures for the 31 provinces include:
 - TFR (calculated from age-specific fertility rates)
 - p_1 (period parity progression ratio, first to second birth)
- p_1 is calculated from period life tables of parity progression, based on reconstructed birth histories

Figure 1. Provinces of China



Figure 2. Time period in which the TFR first fell below replacement, by province

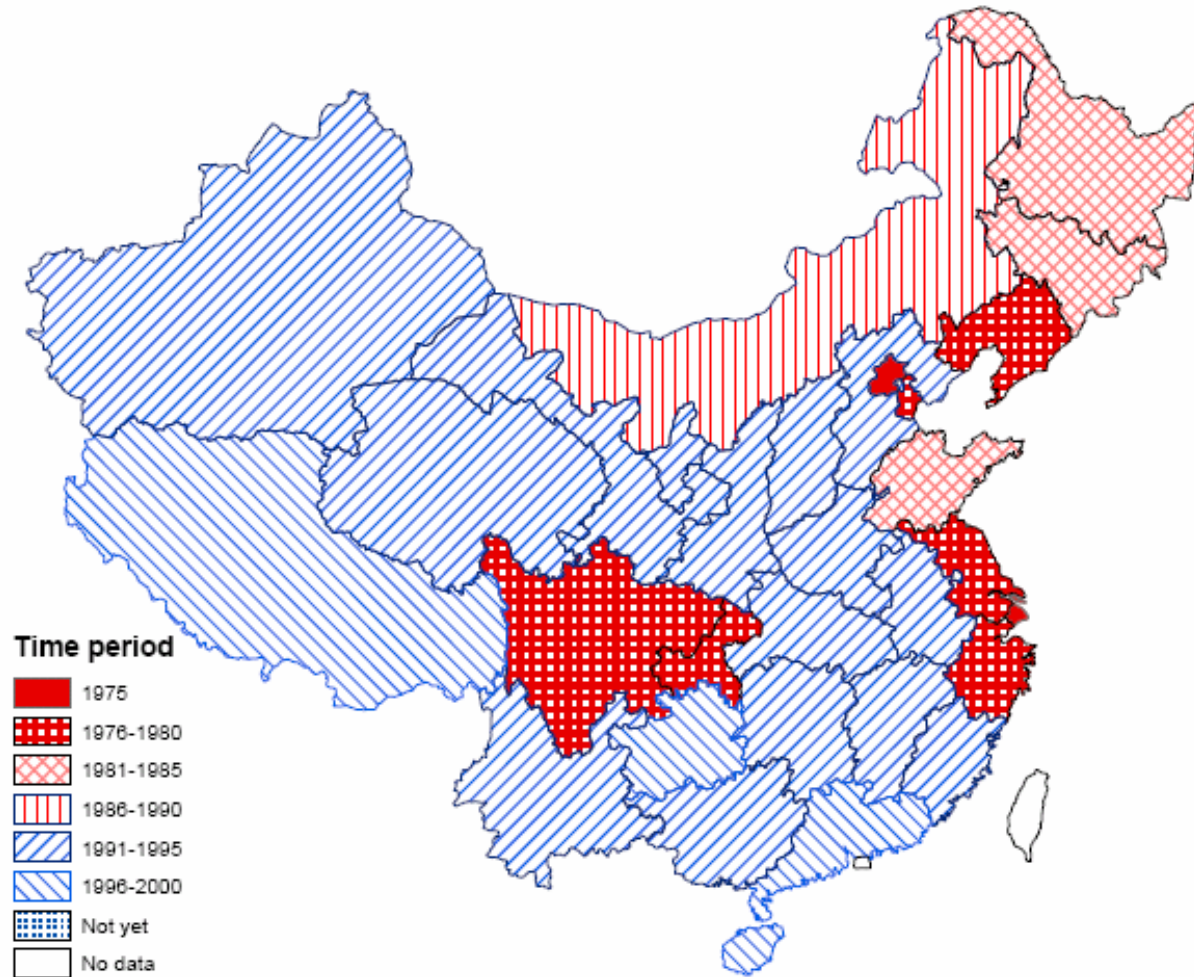


Figure 3. Time period in which a sustained TFR below replacement began, by province

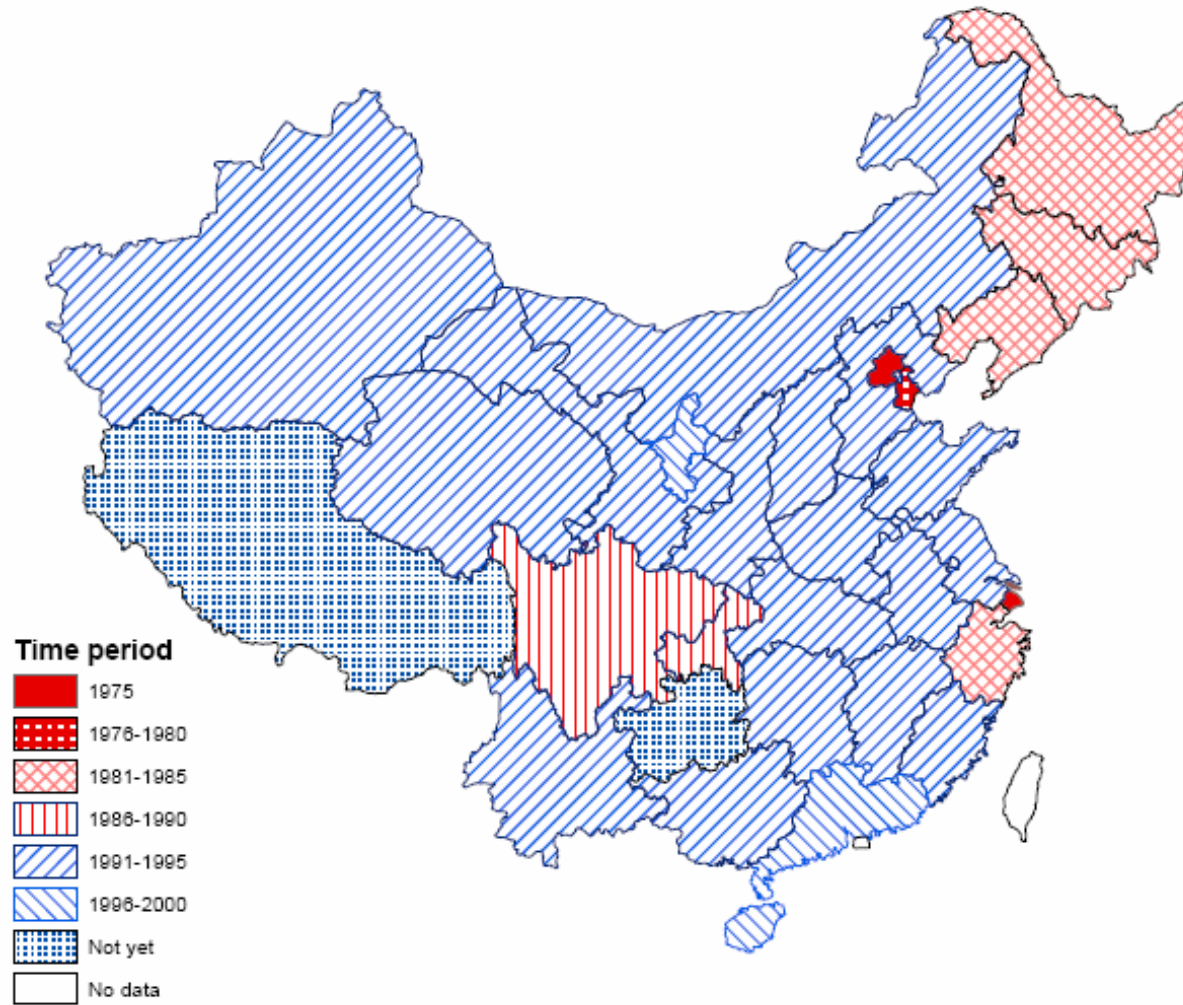


Figure 4. Time period in which a sustained TFR below 1.7 began, by province

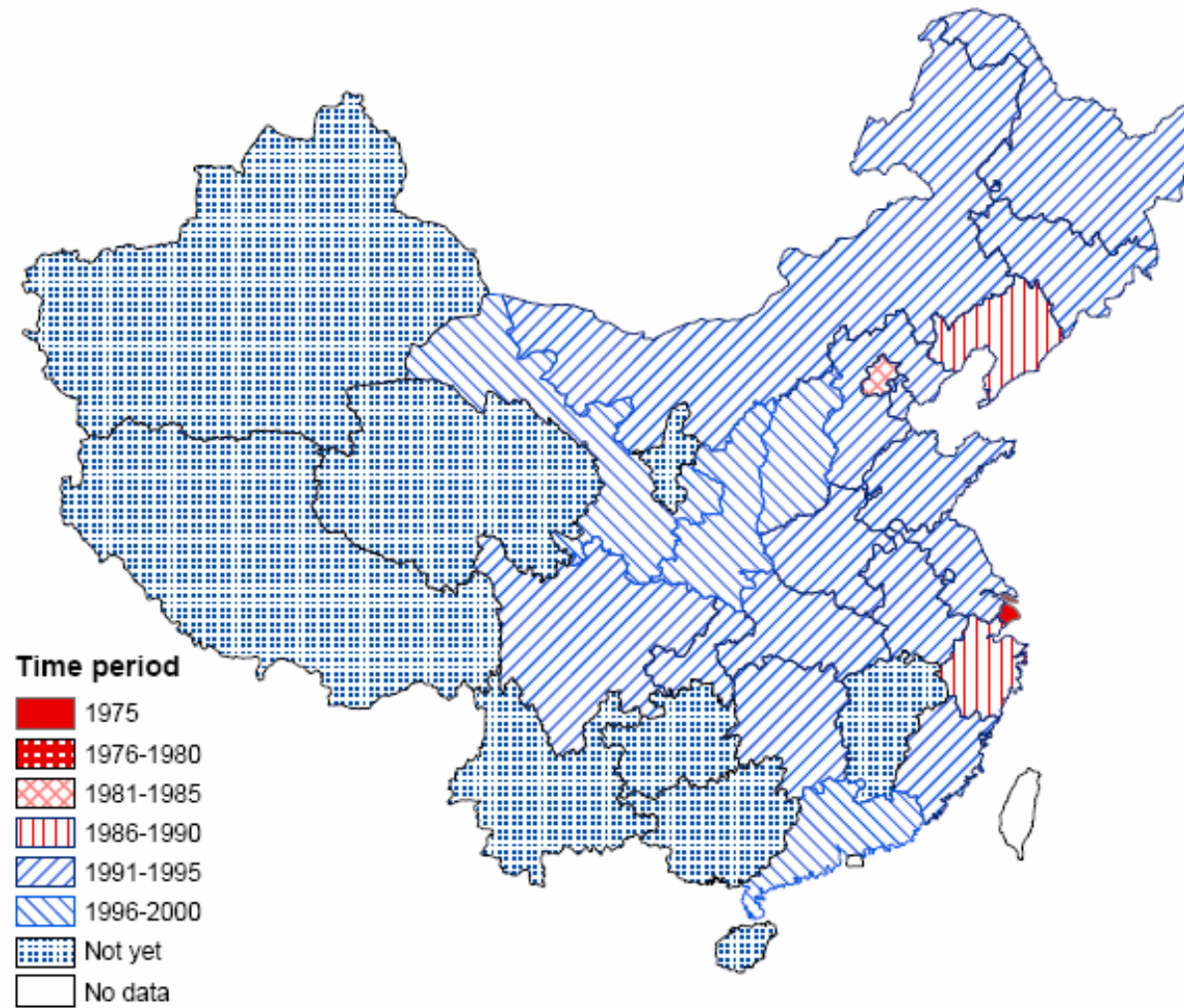


Figure 5. Distribution of provinces by level of p_1 (parity progression ratio for transition from first to second birth): 1979, 1990, and 2000



Additional data for path analysis

- Policy fertility: Defined as “policy TFR” by province near 2000 (Gu et al. 2007), except for Xizang (Tibet)
 - Measures what the provincial TFR would be if all families had the maximum number of children allowed by local birth control regulations
- Per capita GDP (in yuan) by province in 1995, from published data (NBS 1997)
- Human Development Index (HDI) by province in 1999, from published data (UNDP 2002)
 - Based on life expectancy at birth, per capita GDP, and educational attainment

Figure 6. Total Fertility Rates (TFRs) in 2000, by province

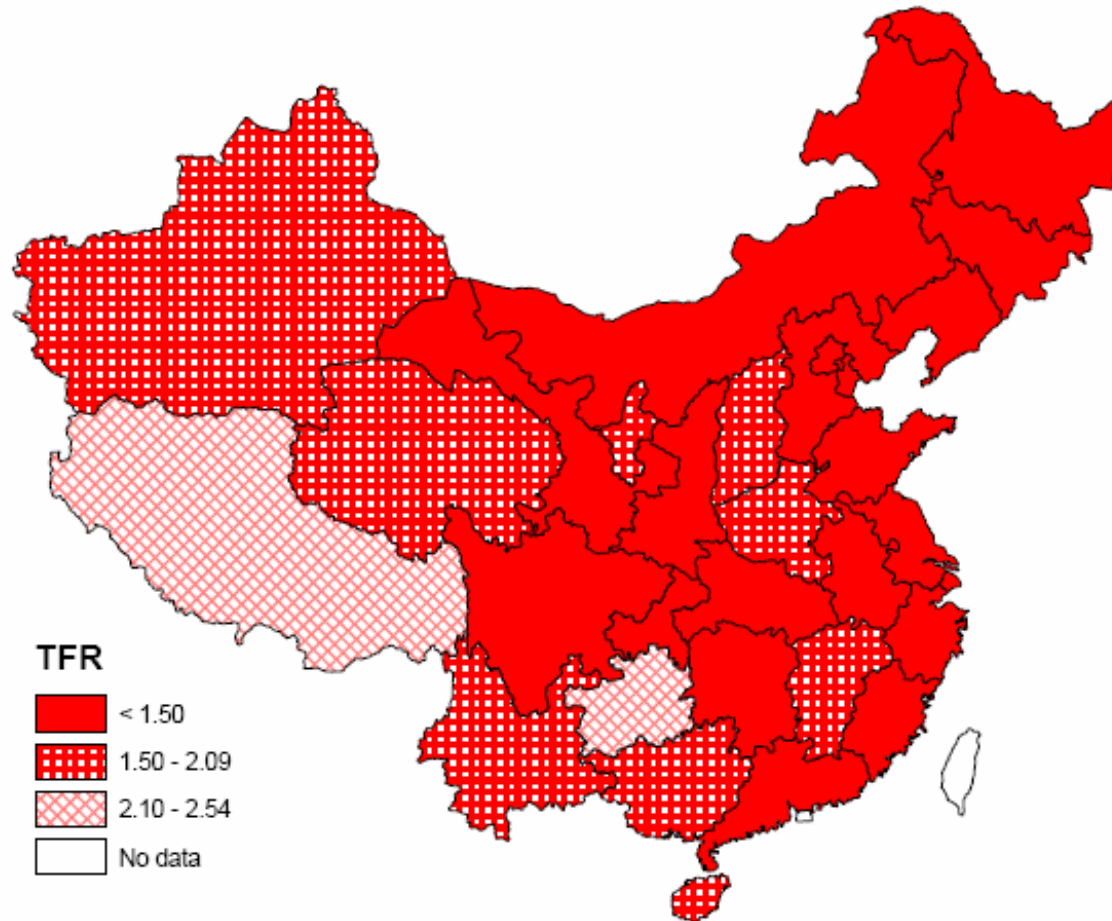
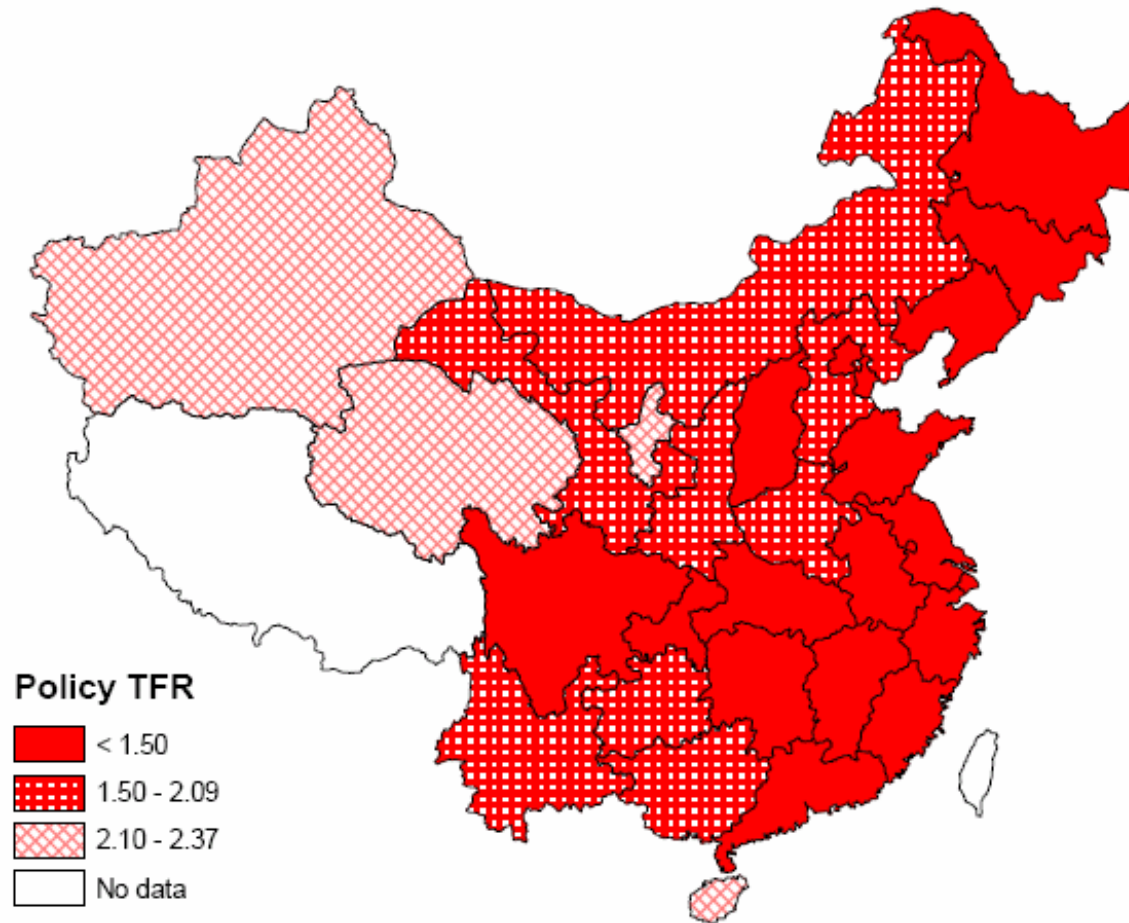


Figure 7. Policy fertility in 1999, by province



Data source: Gu et al. (2007)

Figure 8. Per capita GDP in 1995, by province (in yuan)

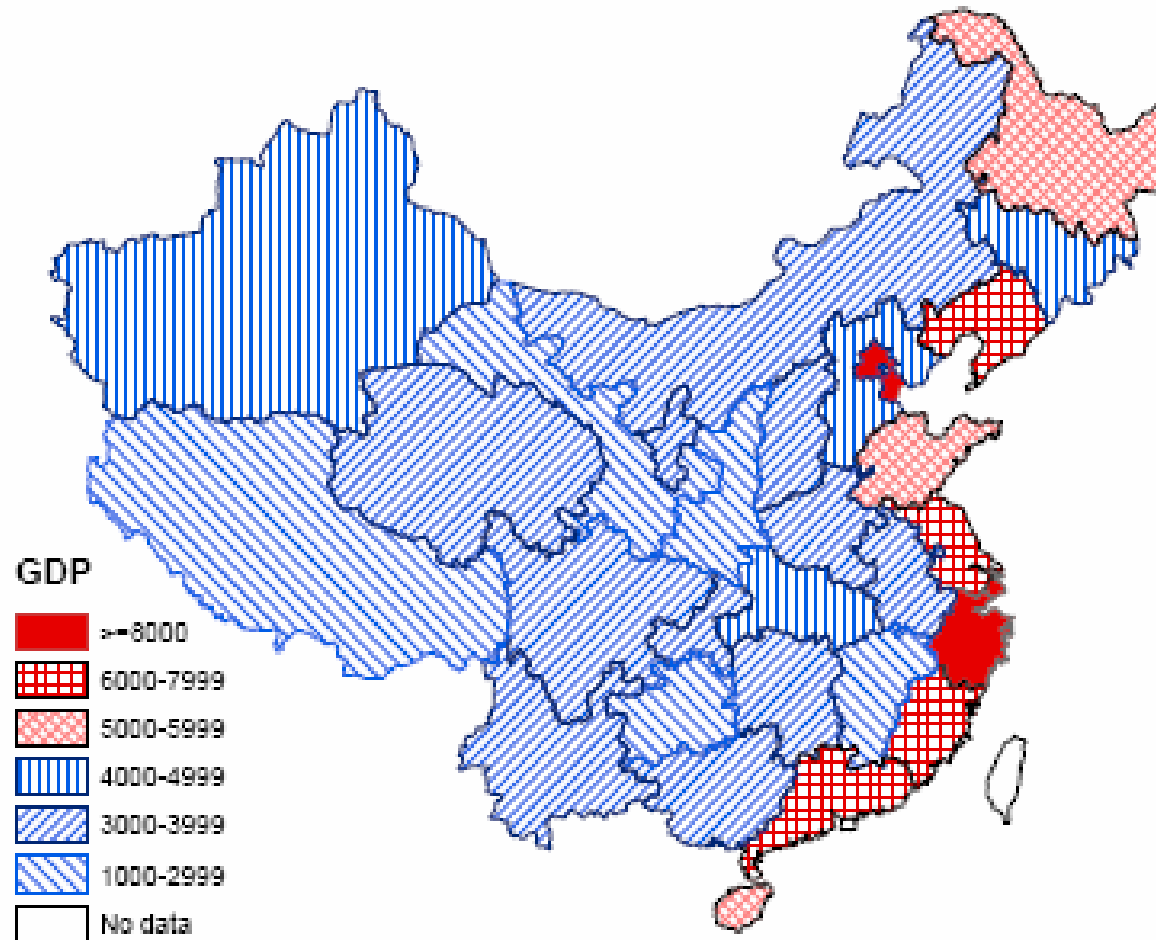
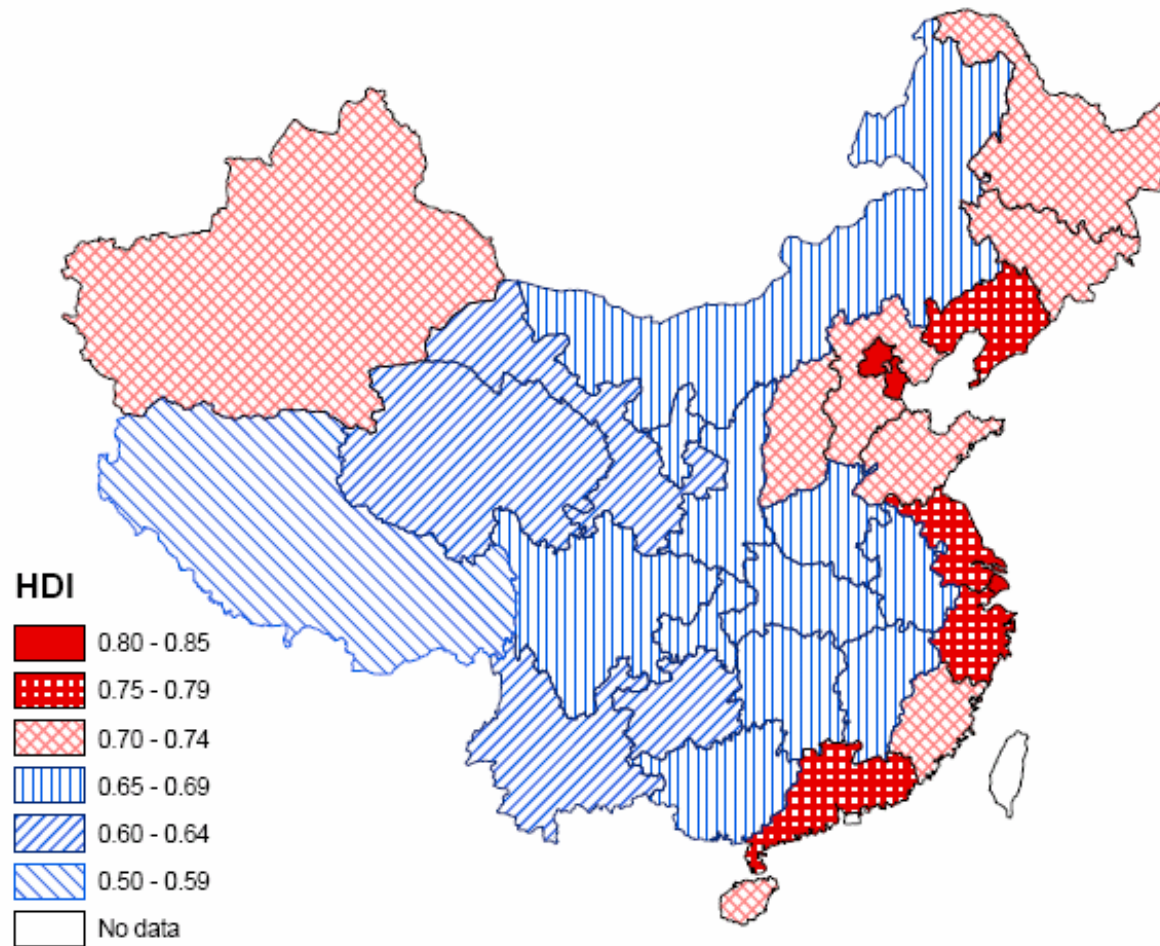


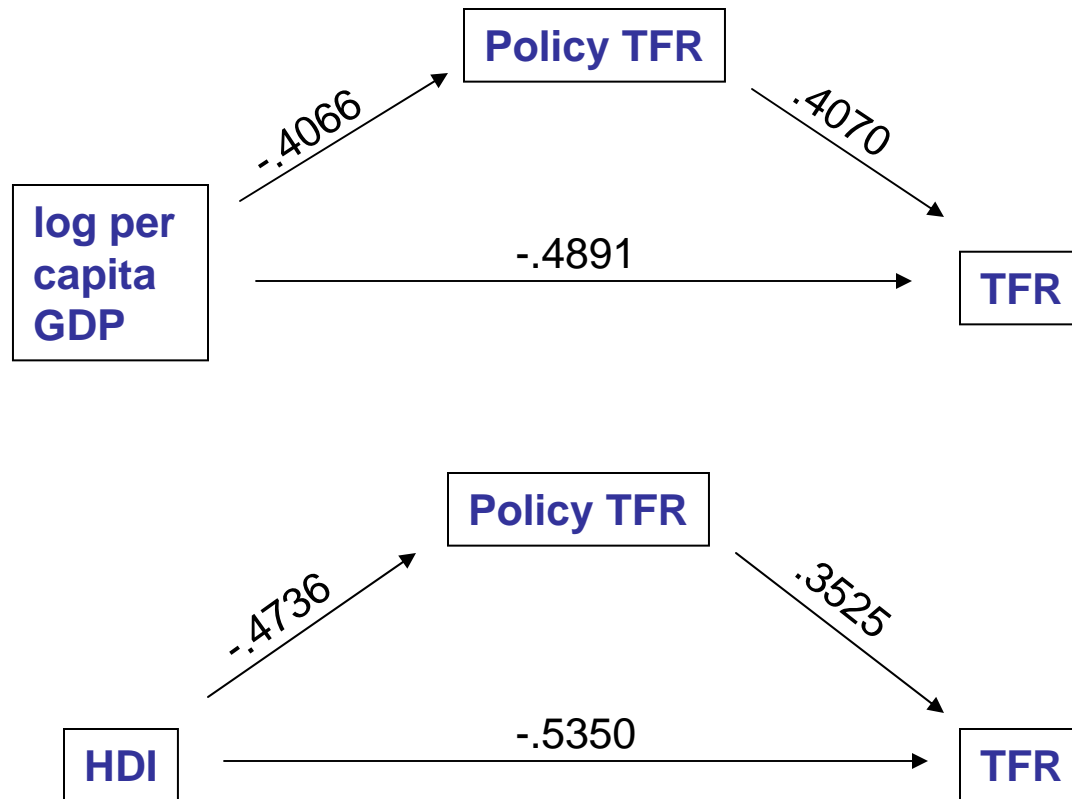
Figure 9. Human Development Index (HDI) in 1999, by province



Methodological details

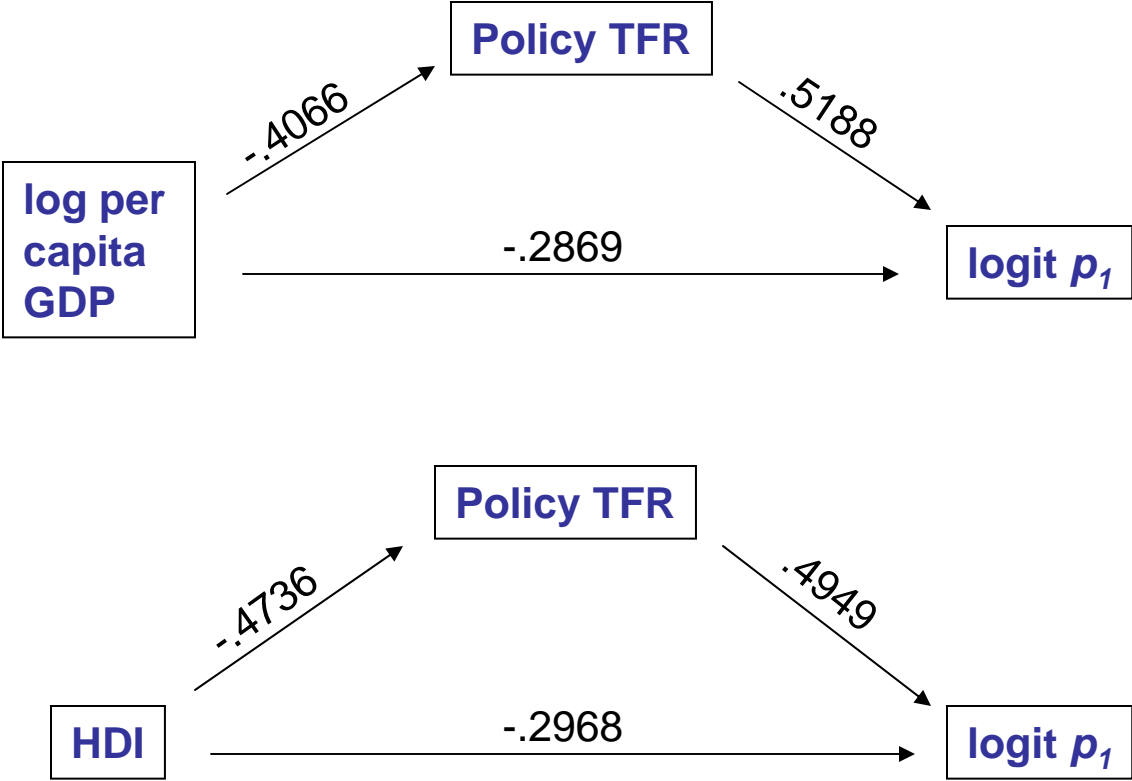
- Units of analysis in the path analysis are provinces, which are weighted by population size (no. of women age 15-50)
- Predictor variables are measured in standard deviation units in the regressions so that coefficients are comparable
- log per capita GDP is used in place of per capita GDP
 - Relationship between log per capita GDP and TFR is close to linear, as is required in a path analysis
- Path diagram assumes that level of development influences policy TFR at the provincial level

Figure 10. Path diagrams of the effects of predictor variables on the total fertility rate (TFR) in 2000



Note: In the underlying regressions, provinces are weighted by the proportion that women age 15-50 in a province are of women age 15-50 in all 30 provinces. All variables are standardized by dividing them by their standard deviations, based on the weighted data.

Figure 11. Path diagrams of the effects of predictor variables on logit p_1 in 2000



Note: See note to Figure 11, which also pertains to this figure.

Effects of policy TFR and development on TFR

- Main findings
 - Depending on which measure of economic and social development is used, between 33 and 42 percent of the effect of the one-child policy (as measured by policy TFR) on the TFR is actually due to development
 - The effect of policy TFR on TFR after development is controlled is 38 to 42 percent less than the effect of development.
 - HDI effects are stronger than per capita GDP effects
- Main conclusion
 - The effect of the one-child policy (i.e., policy TFR) on TFR is smaller than is sometimes assumed

Effects of policy fertility are stronger when the dependent variable is p_1 instead of TFR

- Not surprising, because p_1 is a more direct measure of the effectiveness of the one-child policy than is TFR

Caveats

- The one-child policy may have explained more provincial variation in fertility in earlier years than it did in 2000
 - But data on policy fertility are available only for 1999
- A time-series analysis of change in the TFR might show rather different results, as might also a multi-level analysis that used individual- and province-level data
- Our multivariate analysis does not capture possible feedback from policy TFR to development through the first demographic dividend
- Because of these limitations, our conclusions are tentative and in need of further investigation